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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/631,174	08/02/2000	Lawrence D. K. B. Dwyer	10001219-1	7798

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EXAMINER

LI, AIMEE J

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 08/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/631,174

Applicant(s)

DWYER ET AL.

Examiner

Aimee J. Li

Art Unit

2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8,10-16,18-27,31 and 32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2,4-8,10,11,16,18-27,31 and 32 is/are allowed.
- 6) ☒ Claim(s) 12-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-2, 4-8, 10-16, 18-27, and new claims 31-32 have been considered. Claims 7, 11, 16, and 19 have been amended as per Applicant's request. Claim 30 has been cancelled as per Applicant's request. New claims 31-32 have been added as per Applicant's request.

Papers Submitted

2. It is hereby acknowledged that the following papers have been received and placed of record in the file: Amendment as received on 13 June 2006.

Allowable Subject Matter

3. Claims 1-2, 4-8, 10-11, 16, 18-27, and 31-32 are allowed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lass, U.S. Patent Number 6,092,153 (herein referred to as Lass), in view of Tremblay et al., U.S. Patent Number 6,205,543 (herein referred to as Tremblay).

6. Referring to claim 12, Lass has taught a method for efficiently executing instructions of computer programs, comprising the steps of:

- a. Executing a plurality of computer programs in an interleaved fashion (Lass column 1, lines 62-67; column 4, lines 54-59; column 4, lines 29-30; and column 6, lines 9-28);

Art Unit: 2183

- b. Switching which of said computer programs is being executed in said executing step (Lass column 1, lines 62-67; column 4, lines 54-59; column 4, lines 29-30; and column 6, lines 9-28);
- c. Identifying said address in response to said switching step (Lass column 1, lines 62-67; column 4, lines 54-59; column 4, lines 29-30; and column 6, lines 9-28); and
- d. Storing said retrieved data value in cache memory (Lass column 1, lines 62-67; column 4, lines 54-59; column 4, lines 29-30; and column 6, lines 9-28).

7. Lass has not taught

- a. Storing, prior to said switching step, at an address in computer memory a data value previously written by a pipeline to a data line in execution of an instruction corresponding to one of said computer programs in said executing step and an indicator indicating if the data line was recently accessed;
- b. Determining, based on said indicator, whether the data value was recently accessed prior to said switching step; and
- c. Retrieving, based on said determining step, said data value from said address based on said identifying step and in response to said switching step if said indicator indicates that the data was recently accessed.

8. However Lass has taught in column 4, lines 54-59 that a refinement to the threading system is a partial save and restore of cache information on a context switch but provided no details. Tremblay has taught the details to partially saving and restoring data in data memory with

- a. Storing, prior to said switching step, at an address in computer memory a data value previously written by a pipeline to a data line in execution of an instruction corresponding to one of said computer programs in said executing step and an indicator indicating if the data line was recently accessed (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6);
- b. Determining, based on said indicator, whether the data value was recently accessed prior to said switching step (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6); and
- c. Retrieving, based on said determining step, said data value from said address based on said identifying step and in response to said switching step if said indicator indicates that the data was recently accessed (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6).

9. A person of ordinary skill in the art at the time the invention was made would have recognized, and as taught by Lass and Tremblay, that saving and restoring portions of data memory creates a more refined system (Lass column 4, lines 57-59) and improves the efficiency of context switching in a multiprogrammed processor (Tremblay column 2, lines 4-6).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the

invention was made to incorporate the saving and restoring portions of data memory based upon marker bits, e.g. dirty bits, to have a more refined system with improved context switching efficiency.

10. Referring to claims 13 and 15, Lass in view of Tremblay has taught wherein said executing step further includes the step of executing instructions of a computer program in response to said switching step, and wherein said method further comprises the steps of:

- a. Determining that said address is storing a data value previously utilized in said executing step to execute an instruction of said computer program (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6); and
- b. Performing said identifying step based on said determining step (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6).

11. Referring to claim 14, Lass in view of Tremblay has taught

- a. Said cache memory (Lass column 1, lines 62-67; column 4, lines 54-59; column 4, lines 29-30; and column 6, lines 9-28);
- b. Correlating, respectively, data values stored in said data memory with addresses of said computer memory (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6);

- c. Asserting a bit each time a data value correlated with said address identified in said identifying step is accessed in response to said executing step (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6); and
- d. Periodically deasserting said bit (Tremblay Abstract; column 2, lines 10-31; column 2, line 55 to column 3, line 21; column 5, lines 1-19; column 6, lines 35-43; column 10, line 30 to column 12, line 2; Figure 2; Figure 5; and Figure 6).

Response to Arguments

12. Applicant's arguments filed 13 June 2006 have been fully considered but they are not persuasive.

13. Applicant's argument in essence on pages 16-17 "For at least the reason set forth hereinabove with reference to claim 1, Applicant respectfully asserts that the alleged combination...does not teach or suggest the highlighted features..." This has not been found persuasive. Applicant's arguments with regards to claim 1 focuses on "preloading" the data to the registers in response to a context switch. However, claim 12 does not recite the limitation of "preloading" the data to the registers. Instead, claim 12 merely claims "retrieving" data. *Tremblay* explicitly states in column 1, lines 58-62 that "a saved second process is restored into an executing state", so the data is retrieved on a context switch for the restored executing state.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

15. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aimee J. Li whose telephone number is (571) 272-4169. The examiner can normally be reached on M-T 7:00am-4:30pm.

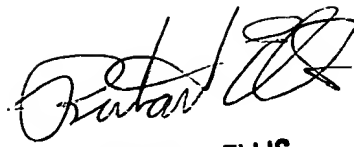
17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 09/631,174
Art Unit: 2183

Page 8

AJL
Aimee J. Li
17 August 2006

A handwritten signature in black ink, appearing to read "Richard L. Ellis", written in a cursive style.

**RICHARD L. ELLIS
PRIMARY EXAMINER**